

CLAIMS

What is claimed is:

1. A method for reassembling a packet, the packet when reassembled includes a plurality of packet fragments with each packet fragment identified with a position within
5 the packet, the method comprising:
 - maintaining a plurality of queues;
 - identifying for a particular packet fragment of the plurality of packet fragments a particular queue of the plurality of queues such that no already queued packet fragment in the particular queue comes after the particular packet fragment in the packet, wherein said
10 identifying the particular queue for the particular packet fragment includes checking, at least when the particular queue is not empty, that the particular queue does not include a packet fragment which comes after the particular packet fragment in the packet;
 - enqueueing the particular packet fragment at the end of the particular queue; and updating a data structure to include an indication of the particular queue in relation to the position
15 of the particular packet fragment in the packet; and
 - retrieving the plurality of packet fragments from the plurality of packet queues based on the data structure to produce the packet.
2. The method of claim 1, wherein said retrieving the plurality of packet fragments is performed in response to identifying that all of the plurality of packet
20 fragments have been enqueued in the plurality of queues.
3. The method of claim 1, including identifying that no queue in the plurality of queues does not already have enqueued a packet fragment in the particular queue which comes after the particular packet fragment in the packet, and in response, expanding the plurality of queues by adding the particular queue to the plurality of queues.
- 25 4. The method of claim 3, including reducing the number of queues in the plurality of queues in response to identifying that the particular queue is empty.

5. The method of claim 4, wherein said reducing the number of queues includes removing the particular queue from the plurality of queues.

6. The method of claim 1, wherein the plurality of packet fragments are retrieved from the plurality of queues in order of their respective position within the packet.

5 7. The method of claim 1, wherein the data structure corresponds to a meta-packet or scorecard including the indications of the queues of the plurality of queues maintained in an order corresponding to the positions of their corresponding packet fragments within the packet.

8. The method of claim 1, wherein at least two packet fragments of the packet are
10 enqueued in a same queue of the plurality of queues.

9. A method for resequencing packets, the method comprising:
maintaining a plurality of queues of a resequencing mechanism;
receiving a particular packet of a stream of packets, each packet of the stream of
packets identifying a sequence number of an ordered sequence of sequence numbers, the
15 particular packet including a particular sequence number;
identifying a particular queue of the plurality of queues such that no packet in the
particular queue includes a sequence number subsequent to the particular sequence
number in the ordered sequence, wherein said identifying the particular queue includes
checking that the particular queue does not include a packet with a sequence number
20 subsequent to the particular sequence number in the ordered sequence;
enqueueing the particular packet at the end of the particular queue; and
retrieving packets in sequence from the plurality of queues.

10. The method of claim 9, including identifying that no queue in the plurality of queues does not include a packet with a sequence number subsequent to the particular sequence number in the ordered sequence, and in response, expanding the plurality of queues by adding the particular queue to the plurality of queues; and wherein said
5 identifying the particular queue includes said checking operation when the particular queue is not empty.

11. The method of claim 10, including reducing the number of queues in the plurality of queues in response to identifying that the particular queue is empty.

12. The method of claim 11, wherein said reducing the number of queues includes
10 removing the particular queue from the plurality of queues.

13. An apparatus for reassembly of a packet, the packet when reassembled includes a plurality of packet fragments with each packet fragment identified with a position within the packet, the apparatus comprising:

a plurality of reassembly queues;

5 a reassembly mechanism; and

a distributor configured to acquire a particular packet fragment of the plurality of packet fragments and to identify a particular queue of the plurality of reassembly queues such that no already queued packet fragment in the particular queue comes after said particular packet fragment in the packet, wherein said identifying the particular queue
10 includes checking, at least when the particular queue is not empty, that the particular queue does not include a packet fragment which comes after said particular packet fragment in the packet; wherein the distributor is configured to cause said particular packet fragment to be enqueued at the end of the particular queue; wherein the distributor is configured to update a data structure to include an indication of the particular queue in
15 relation to the position of said particular packet fragment in the packet; and wherein the distributor is configured to identify when all packet fragments of the packet have been received and in response, to provide the reassembly mechanism with indications of the queues of the plurality of reassembly queues containing packet fragments of the packet and their order corresponding to that of the order of the plurality of packet fragments in
20 the packet; and

wherein the reassembly mechanism is configured to retrieve the plurality of packet fragments from the plurality of resequencing queues and reassemble the plurality of packet fragments to produce the packet.

14. The apparatus of claim 13, wherein the reassembly mechanism is configured
25 to retrieve the plurality of packet fragments from the plurality of resequencing queues in their respective order within the packet.

15. The apparatus of claim 13, wherein the distributor is configured to communicate a meta-packet or scorecard including said indications of the queues.

16. The apparatus of claim 13, wherein the distributor is configured to identify that every queue in the plurality of queues already includes a packet fragment
5 corresponding to subsequent position in the packet and in response, causing the plurality of queues to expand in number by adding the particular queue to the plurality of queues.

17. The apparatus of claim 16, wherein the apparatus is configured to reduce the number of queues in the plurality of queues in response to identifying that the particular queue is empty.

10 18. The apparatus of claim 17, wherein said reducing the number of queues includes removing the particular queue from the plurality of queues.

19. The apparatus of claim 13, wherein the distributor identifies a same particular queue of the plurality of reassembly queues for at least two of the plurality of packet fragments.

20. A method for resequencing and reassembling of packets, the method comprising:

maintaining a plurality of queues;

acquiring a packet fragment of a plurality of packet fragments of a packet,

5 wherein a stream of a plurality of packets includes the packet;

identifying a particular queue of the plurality of queues for the particular packet fragment such that no already queued packet fragment in the particular queue comes after the particular packet fragment in the packet and the particular queue includes no already queued packet fragment of a packet subsequent to the particular packet in the stream of packets; wherein said identifying the particular queue includes checking, at least when the particular queue is not empty, that the particular queue does not include a packet fragment which comes after the particular packet fragment in the packet or the stream of packets; enqueueing the particular packet fragment at the end of the particular queue; and updating a data structure to include an indication of the particular queue in relation to the position
10 of the particular packet fragment in the packet and the stream of packets; and
15 retrieving the plurality of packet fragments from the plurality of packet queues based on the data structure to produce the packet.

21. The method of claim 20, wherein said retrieving the plurality of packet fragments is performed in response to identifying that all of the plurality of packet
20 fragments have been enqueueued in the plurality of queues and no other packet prior to the packet in the stream of packets is enqueueued in the plurality of queues.

22. The method of claim 20, including identifying that no queue in the plurality of queues does not already have enqueueued a packet fragment in the particular queue which comes after the particular packet fragment in the packet or a packet fragment of a packet
25 subsequent to the packet, and in response, expanding the plurality of queues by adding the particular queue to the plurality of queues.

23. The method of claim 22, including reducing the number of queues in the plurality of queues in response to identifying that the particular queue is empty.

24. The method of claim 23, wherein said reducing the number of queues includes removing the particular queue from the plurality of queues.

5 25. The method of claim 20, wherein the plurality of packet fragments are retrieved from the plurality of queues in order of their respective position within the packet and the order of the packet within the stream of packets.

26. The method of claim 20, wherein the data structure corresponds to a meta-packet or scorecard including the indications of the queues of the plurality of queues
10 maintained in an order corresponding to the positions of their corresponding packet fragments within the packet.

27. The method of claim 20, wherein at least two packet fragments of the packet are enqueued in a same queue of the plurality of queues.

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